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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,250	09/28/2004	Shinji Shimosaki	12054-0029	1341

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EXAMINER	
DINH, BACH T	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
11/06/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/509,250	SHIMOSAKI, SHINJI	
	Examiner	Art Unit	
	BACH T. DINH	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 June 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *17-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *17-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Summary

1. This is the response to the communication filed on 06/22/2009.

2. Claims 17-19 remain pending in the application.

3. The application is not in condition for allowance.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fray et al. (US 2006/0086621) in view of Shiota et al. (WO 9847824) with equivalent English translation provided by Shiota et al. (US 2002/0070155).

Addressing claims 17-18, Fray discloses a method of deoxidizing a metal salt in which a metallic calcium is dissolved (figure 2, [0064-0069]), comprising;

Deoxidizing a second material comprising a titanium material by immersing the second material into the metal salt ([0063-0068], titanium dioxide is deoxidized to form titanium metal in dissolved metallic calcium).

Furthermore, Fray discloses dissolved oxygen and other impurities are removed in the process [0051].

Fray is silent regarding the step of purifying the dissolved metal salt with a first material comprising titanium, a titanium alloy, zirconium and a zirconium alloy and the relationship between the volume of the metal salt and the total surface area of the first material.

Shiota discloses a method of purifying waste water of impurities by the usage of solid catalyst and solid absorbent [0017] made of zirconium, titanium and alloys such as stainless and Hastelloy [0090, 0162 and 0164].

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the method of Fray with the method of purifying the waste water with titanium, zirconium and alloys of Shiota because doing so would allow one to treat the metal salt solution of Fray by adsorbing impurities with the adsorbent of Shiota.

Furthermore, one would have found it obvious to modify method of Fray and Shiota by using the material of titanium, zirconium and their alloys as adsorbent material because Shiota already discloses using zirconium as the solid catalyst [0162] and titanium as the solid adsorbent [0164] as well as other metal alloys in purifying the waste water [0127-0128]; therefore, one with ordinary skill in the art would have expected the alloys of

zirconium and titanium would have the adsorbing ability as the zirconium and titanium materials.

Fray and Shiota are silent regarding the relationship between the volume of the metal salt and the total surface area of the first material.

Shiota discloses the void percentage of the packed bed of adsorbent in order to optimize the waste water treatment efficiency [0140-0142]. The void percentage directly correlates to the surface area of the adsorbent that comes into contact with the fluid. Furthermore, one would intuitively know that in order for an adsorbent to effectively adsorb impurities in a given fluid, the physical contact between the surface area of the adsorbent material and the fluid must be maximized. Therefore, for a given fixed volume, an adsorbent with larger surface area would be more effective at adsorbing the impurities than another adsorbent with smaller surface area.

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the method of Fray and Shiota by experimenting with the void percentage or the total surface area of the adsorbent material because doing so would allow one to optimize the flow of the treating fluid and preventing abrasion of solid catalyst (Shiota, [0140]); thereby, optimize the efficiency in which the adsorbent material treats the fluid. Therefore, one with ordinary skill in the art would have arrived at the claimed relationship between the volume of the metal salt and the total surface area of the adsorbent material when performing routine experimentation with the void percentage or the surface area of the adsorbent material in order to optimize the flow of the metal salt solution and the efficiency in which the adsorbent material treats the metal salt solution.

Moreover, for a given fixed metal salt volume, increasing the void percentage or the surface area of the adsorbent material would inherently decrease the V/S ratio.

Addressing claim 19, Fray and Shiota are silent regarding the foil-like shape of the titanium adsorbent.

Shiota discloses the adsorbent material can be of any shape [0132-0134] as long as the waste water is uniformly supplied to the adsorbent material.

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the shape of the titanium adsorbent material to be foil-like because Shiota discloses that the adsorbent material can be of any shape [0132-0134], with the shapes of pellet, fiber and chain that would read on the claimed "foil-like" shape of current claim. In the alternative, the foil-like shape is obvious over the teaching of Shiota for one with ordinary skill in the art would have arrived at the claimed shape when experimenting with the shape of the adsorbent material in order to optimize the flow of the fluid and the dispersion of the fluid in the adsorbent material (Shiota, [0132]).

7. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fray et al. (US 2006/0086621) in view of Nukami et al. (US 5,336,291) and Murase et al. (JP2000109905) with English Derwent Abstract and machine translation. Nukami and Murase are cited and relied on for the first time in this office action. Their use was necessitated by applicant's amendment to the claims.

Addressing claims 17-18, Fray discloses a method of deoxidizing a metal salt in which a metallic calcium is dissolved (figure 2, [0064-0069]), comprising;

Deoxidizing a second material comprising a titanium material by immersing the second material into the metal salt ([0063-0068], titanium dioxide is deoxidized to form titanium metal in dissolved metallic calcium).

Furthermore, Fray discloses the needs to remove the dissolved oxygen, nitrogen and other impurities are removed in the process [0051].

Fray is silent regarding the step of purifying the dissolved metal salt with a first material comprising titanium, a titanium alloy, zirconium and a zirconium alloy and the relationship between the volume of the metal salt and the total surface area of the first material.

Nukami discloses a method for producing metallic composite material; wherein, a pellet 16 (figures 1-4) is made of titanium powder and zirconium powder for absorbing oxygen and nitrogen in the molten bath (2:49-64).

Murase discloses a method for producing low oxygen metal powder product; wherein, titanium, zirconium and their alloys are used for absorbing oxygen and other gases [0017].

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the method of Fray with the method of absorbing dissolved oxygen and nitrogen in the molten bath using the pellet of zirconium and titanium powder of Nukami with the titanium and zirconium alloys of Murase because the pellet of Nukami and the alloys of Murase are capable of absorbing oxygen and both are used for

producing metal products similar to that of Fray. Therefore, treating the metal salt solution of Fray with the pellet of Nukami and the alloys of Murase would remove the dissolved oxygen and other gases; thereby, improving the efficiency of the metal production process of Fray (Fray, [0032-0033], dissolved oxygen is removed in order to ensure the current and energy efficiency). The pellet of Nukami and the alloys of Murase constitute the first material.

Fray, Nukami and Murase are silent regarding the relationship between the volume of the metal salt and the total surface area of the first material.

Nukami discloses the titanium and zirconium pellet is perforated (4:1-4); thereby implying that the molten material flows into the voids of the pellet. Additionally, both Fray (figures 1-5) and Nukami (figures 2 and 4) disclose the volume of the molten material in the bath is fixed by the volume of the vessel. Furthermore, one would intuitively know that in order for a material to absorb dissolved oxygen and nitrogen from the molten fluid, the surface area of the material must come into physical contact with the molten fluid. Moreover, for a molten fluid with its volume being fixed by the volume of the vessel, increasing the total surface area of the adsorbing material would effectively decrease the V/S ratio for the volume of the molten fluid is constant and fixed by the volume of the vessel.

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the method of Fray, Nukami and Murase by increasing the total surface area of the pellet of Nukami and the titanium and zirconium alloys of Murase because doing so would increase the physical contact between the pellet and alloys with

the molten fluid of Fray; thereby, increasing the amount dissolved oxygen and nitrogen that get absorbed by the pellet and the alloys. Therefore, for a given molten metal bath with fixed volume as shown in figures 1-5 by Fray, one with ordinary skill in the art would have arrived at the claimed relationship between the volume of the metal salt and the total surface area of the first material when performing routine experimentation in order to maximize the physical contact between the first material and the metal salt by increasing the surface area of the perforated first material.

Addressing claim 19, the word "foil" is interpreted to include the definition "a thin sheet"; therefore, the titanium containing pellet 16 disclosed by Nukami has the foil-like shape as required by current claim.

Response to Arguments

8. Applicant's arguments with respect to claims 17-19 have been considered but are moot in view of the new ground(s) of rejection.

Shiota, Nukami and Murase are cited to show that titanium, zirconium and their alloys are capable of absorbing impurities, such as dissolved oxygen and nitrogen, which are undesirable for the titanium production process of Fray. Therefore, the method of purifying the metal salt prior to the production of titanium is obvious over the combined disclosure of Fray in view of Shiota and Fray in view of Nukami and Murase as discussed above.

With respect to the claimed relationship between the volume of the metal salt and the total surface area of the first material, Shiota discloses the need to optimize the void percentage of the absorbent material as discussed above; therefore, Shiota contemplate optimizing the surface area of the absorbent material in order optimize the physical contact between the absorbent material and the fluid as discussed above. Furthermore, Nukami discloses the pellet of titanium and zirconium is perforated. Moreover, one would intuitive know that in order for a material to absorb dissolved oxygen and nitrogen from the molten fluid, the surface area of the material must come into physical contact with the molten fluid. Moreover, for a molten fluid with its volume being fixed by the volume of the vessel as disclosed by Fray and Nukami, increasing the surface area of the adsorbing material would effectively decrease the V/S ratio for the volume of the molten fluid is constant and fixed by the volume of the vessel. Therefore, the claimed relationship between the volume of the metal salt and the surface area of the first material is obvious when one with ordinary skill in the art performing routine experimentations in order to optimize the physical contact between the first material and the metal salt; thereby, increasing the amount of dissolved oxygen and nitrogen that get absorbed by the first material.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BACH T. DINH whose telephone number is (571)270-5118. The examiner can normally be reached on Monday-Friday EST 7:00 A.M-3:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on (571)272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit 1753

BD
11/03/2009